SCIENCE & GOVERNMENT REPORT

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Health of Science: Looking Good, Feeling Bad

The message of the latest deep probe into science in the universities is that it is like a medicated and bandaged racehorse that keeps winning but may soon collapse.

That's the principal finding of *The State of Academic Science: The Universities in the Nation's Research Effort,* a worthier-than-most inquiry into the slippery subject of what's really going on out there in the academic laboratories. Written by two professors of government, Bruce L.R. Smith, of Columbia, and Joseph J. Karlesky, of Franklin and Marshall College, the 247-page study was financed by the National Science Foundation and, with the aid of the Sloan Foundation, is being published this week by Change Magazine Press ($5.95, NBW Tower, New Rochelle, New York 10801). Despite this usually deadening patronage, however, *The State of Academic Science* commands attention and may even exert some influence on the people who provide money and policy for science. The reason is that it does quite nicely in reconciling the current high productivity of academic science with near-universal complaints of financial malnutrition.

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The explanation for this apparent paradox, the authors say, is that in the competition for scarce federal funds, a handful of departments at major universities have actually increased their take, and, though suffering pinches here and there, are continuing to churn out commendable research, which helps bring in even more money and talent. In the nether regions of academe, however, the money drought has eroded research capabilities, making the second- and third-ranking universities even less capable of competing for funds.

As a result, Smith and Karlesky report, academic science is riddled with all sorts of difficulties that are only now becoming clear. Among them is the creation of an institutional elite that more or less prospers while others decay, a spread of caution in picking research topics, and a deterioration in the instrument base as all institutions — even the top-rated ones — concentrate on paying their day-to-day bills.

Basing their findings on visits to 36 universities and interviews with some 760 administrators, researchers, and graduate students, the authors conclude that:

"On the positive side, the continued scale, vigor, and creativity of American science in virtually all fields of the research endeavor can be termed outstanding. For those concerned that the funding climate of the past decade might have resulted in a sharp setback for the nation's science effort, these findings will be reassuring. Contrary to some fears, there has been no general breakdown in morale among the nation's outstanding academic scientists. . . .

"Yet the signs of trouble for the future are unmistakable . . . They relate to the underlying strength of the institutional base upon which the predominant system of project support must rest. The evidence of deterioration in the underlying infrastructure for science

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In Brief

George C. Pimintel, professor of chemistry at the University of California, Berkeley, is likely to be the next deputy director of the National Science Foundation. He's the No. 1 choice at the Foundation, but the decision won't be final until the slow-moving White House gives its approval. With psychologist Richard Atkinson in the directorship, the appointment of a physical scientist as deputy director would continue the NSF tradition of dividing the two top spots between the hard and the soft sciences.

Meanwhile, the White House staff reorganization, due to be announced any day now, could bring major changes for the newly re-established White House science office. There's a strong possibility that it might be folded into a newly created policy evaluation office, a shift that wouldn't be well received by those who successfully argued last year that science policymaking should be visible and self-contained in the presidential staff hierarchy.

The so-called disease-of-the-month club has traditionally urged the creation of new institutes at NIH to fight this or that ailment. But with money in short supply, it's now settling for less. Thus, Senators Cranston, Hayakawa, and Hatfield recently urged Congress to resolve "That a state of war is hereby declared to exist between the United States and amyotrophic lateral sclerosis" — also known as Lou Gehrig's disease. Cranston, however, appended a statement pointing out that "This resolution does not seek the allocation of Federal resources . . . It merely calls on us as Americans to help other Americans and their families in fighting their battles against ALS."

. . . Pressed for Funds, Researchers Playing Safe

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is now extensive: Facilities are becoming outdated; there are difficulties providing adequate maintenance for facilities; and less discretionary money is available for departments to 'fill in the gaps' and tide investigators over periods of uncertain support for their work."

Citing the paperwork glut that confronts academic science in its relations with the federal and state governments, Smith and Karlesky observe that "The complexity of keeping the research effort going, absorbing as it does more resources and energy each year, begins to cut into the time necessary for creative scientific endeavor. The most serious aspect is that such adverse trends all seem to reinforce each other and point in the same direction, toward a less speculative science, taking fewer chances, sticking with established lines of investigation. The situation now seems the same for the established investigator, for the agency program official, and for the graduate student. 'Playing it safe' becomes the path of least resistance."

Avoiding the doomsday mood that usually characterizes reports on the condition of science, the authors state that "The academic science system has great momentum, and the near-term prospect is for continued excellence in the scientific effort... This study is not meant to strike an alarm or sound an unjustified note of gloom. We do see, however, a possibility of a potentially serious decline in research capability before the problem emerges as a public issue. The same momentum in science that carries the system forward in times of fluctuations of support, temporary economic downturns, and relative austerity can also work in reverse: A downward spiral, if allowed to develop, could be difficult to turn around. In this event, a costly and massive public investment would be necessary to revive a faltering system. Yet attention to trouble spots now can maintain the healthy, dynamic state of a successfully functioning system."

Among the trouble spots that they address, "stratification" — i.e., the widening of the gap between top-rated and lesser departments — seems to arouse their greatest concern. This development, they point out, has not proceeded from any publicly debated policy decision; rather, it has quietly evolved through the process of tight funds being allocated in a competitive system. As a result, the authors report, "the most serious impact of recent trends has been felt in second-rank departments and institutions. In contrast, the leading science departments have tended to retain their scientific eminence and their relative strength. They have even strengthened their positions somewhat given the difficult circumstances for contemporary higher education. The downward trend has not appeared uniformly throughout all second-rank institutions, and the indicators of trouble have not reached an advanced state. But the signs are sufficiently clear to warrant the conclusion that a very rapid deterioration in the relative position of many weaker departments could well occur in the near future.

"To the extent that a somewhat austere funding environment for academic research continues," they state, "these tendencies toward stratification may accelerate. The realities of modern science — the cost and increasing complexity of experimental research at

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Neglectful Federal Policy

"Ever since World War II, the federal government has regarded universities as places where research capacity can be tapped at will to produce findings of interest to federal agencies — including basic research. This is a profoundly inadequate view. Universities provide a unique environment for research and learning. The characteristics of that environment account for the fact that the center of gravity for basic research is in universities. If the federal government expects universities to continue to contribute in the future as they have in the past, attention must be paid to maintenance of their general strength."

Charles V. Kidd, executive secretary, Association of American Universities, foreword to The State of Academic Science.

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. . . Competitive "Slimmed-Down" System Urged

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the frontiers of knowledge — also create strong pressures on the system to have fewer departments prepared to conduct research of the highest quality."

Conceding that the rapid expansion of the 1960s may have resulted in over-expansion and some research "of less than first-rank quality," Smith and Karlesky nevertheless urge attention to the question of how many centers of scientific excellence are desirable for the US.

Competition, they argue, is an essential ingredient for maintaining the health of the scientific enterprise, but "It is possible that the competitive elements in the system could also be undermined if there are too few universities equipped for preeminent research. The nation might then be forced to rely on a narrow base of dominant centers. The competitive pressures in the system can, however, operate quite effectively with, say, 50 strong departments competing for research funds in a certain field in contrast to twice that number. But could such competitive pressures work equally well if there were only 15 serious producers of quality research in a given scientific field?"

Having outlined the problems of American academic science with skill and in considerable detail, Smith and Karlesky survey the future with considerable caution.

"It does not seem likely to us," they state, "that the country will encourage or permit a basic shift in the nature of its higher education system — one that would result in a dozen or so major research institutions, the remainder acting essentially as teaching institutions. And it is equally unlikely that some two hundred strong, research-intensive, doctoral-granting institutions will be preserved in the future. Something between the broadly diversified system of the present and an extremely narrowly based system will probably emerge for academic science.

"What we see as the most appropriate alternative is a somewhat slimmed down but still broadly based and competitive system, with vigorous ongoing scientific activity in numerous universities across the country."

To support this system, and particularly to restore the decaying infrastructure of scientific research, they opt

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"Academic Science" Cites Growth of Special Institutes

Following are some additional major points from The State of Academic Science:

• "Project institutes" — independent, incorporated research organizations staffed by part-time faculty members — "appear to be proliferating rapidly." The report states that "From a professor's point of view, a project institute can bring added income, flexibility to do work that the university might not approve, and freedom from paying university overhead while still maintaining access to facilities such as the university's library and computers. . . . Their potential for abuse — overcommitted faculty or unreimbursed use of university facility — is apparent but seems largely controlled by sensible university regulations . . .However, no reliable date are available on their numbers, funding levels, or importance as research performers."

• "Both the industrial and academic (research) sectors have shown a strong desire to rectify their neglect of each other in the recent past and to establish better relationships. In attempting to strengthen these links, however, they have encountered difficulties. Universities and industrial firms have often discovered that they have different objectives, different incentive systems, and different approaches to research that have not been easy to bridge, despite good intentions on each side. . . ."

• In chemistry, "The highest ranked departments have apparently maintained or improved their funding shares relative to lower ranked departments. Within the strong departments, sponsored research is becoming the province of a smaller number of investigators who are presumably more highly qualified then their colleagues who are not funded."

• There has been no broadscale White House policy statement on federal support of university-based research since 1965, when President Johnson issued a statement calling for increasing the number of centers of excellence in academic research.

• Between 1971 and 1975, the number of engineering PhDs awarded annually declined from a peak of 3495 to 2959. The apparent reason for this is declining industrial interest in PhD-level employees.

• "Our site visits confirmed the general picture of gradual deterioration in the instrumentation base. A number of universities have postponed the replacement of equipment and deferred maintenance during the recent period of budgetary stringency. Federal support for R&D plant and equipment reached $126 million in 1965 and dropped to $29 million in 1974, though the following year, it rose to $44.8 million.

• The number of graduate students supported by federal fellowships and traineeships increased from 15,600 to 51,400 between 1963 and 1968; by 1974, it had declined to 18,472.

Daddario to Leave OTA Directorship by July 1

Emilio Q. Daddario submitted his resignation last week as Director of the Office of Technology Assessment, a post he has held since OTA was established three and a half years ago. In a letter to Senator Edward Kennedy, chairman of OTA's Congressional board, Daddario stated he will depart by July 1.

"In the next several days I will be forwarding for your review a draft of an assessment on solar energy and as I do so, I feel I will have come to the time when I would like to leave OTA," Daddario stated in his letter to Kennedy. Noting that conclusion of the solar study "brings to an end the first phase of OTA activity which has been of a building and exploratory nature," Daddario went on to say that he "had always planned to leave OTA when that period of evolution had been reached." He didn't state his post-OTA plans.

Rumors are circulating that Daddario's resignation is the culmination of a longstanding disagreement with Kennedy over OTA's role and performance, a disagreement which was exacerbated when Kennedy persuaded OTA's advisory council to conduct a thoroughgoing review of the organization last month (SGR Vol. VII, No. 9). Daddario could not be reached for comment on the rumors early last week, though other sources in OTA simply noted that Daddario has long maintained that he would depart before his six-year term expired. In any case, the Council's study will still go ahead.

OTA's early performance has, however, already drawn some critical reviews. Two years ago, Harold Brown, now Secretary of Defense, resigned from OTA's advisory Council with a letter stating that "few of us on the Council, I believe, would say that we are satisfied with what has been accomplished, compared with what we had hoped for and still believe possible." Brown suggested that OTA had got bogged down in trivial assignments to the detriment of providing Congress with "an early warning system" (SGR Vol. VI, No. 12).

Brown's comments were followed by a critical report from an obscure House unit called the Commission on Information and Facilities, chaired by Rep. Jack Brooks (D-Tex.) The report charged that "while progress is being made, OTA remains substantially short of reaching levels of performance reasonably expected of an information resource of its size and cost and access to expertise." The report painted a picture of confused organizational structure and disagreements about OTA's role.

Finally, a House-Senate appropriations conference committee last year trimmed OTA's budget request and, while acknowledging that the organization had done some good work, the committee said that "It is incumbent upon the OTA, as a young organization, to prove its worth to Congress."

ACADEMIC

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for a rather modest solution: a system of formula grants, similar to NIH's basic biomedical research grants, which would give universities a sum of essentially unfettered money to meet some of the costs that are not covered by project grant funds. NSF, which dropped the formula system recently, should revive it, they recommend, and NIH should expand its role in this area.

"Although this support formula would not persuade a university with little or no research capacity to compete for project funds," they write, "it would provide for those already committed to research a small amount of funds for equipment needs, start-up grants for young faculty, research assistants, or other special purposes."

The *State of Academic Science* enters a field that is well cluttered with reports, analyses, and recommendations. As such, there is the possibility that it will be lost in the background noise of the ongoing debate over what, if anything, ails academic science and what might be done about it. That would be unfortunate. Smith and Karlesky have produced a revealing portrait of the condition of American science; their account, based on broad travels and an examination of earlier literature, does not reek of special pleading. In fact, their endorsement of a "slimmed-down" research establishment is a heresy that is likely to provoke anger among those elder statesmen of science who, incredibly, still believe that science merits a blank check on the US Treasury.

As the authors repeatedly state, the deterioration of the scientific base is not yet so advanced that it cannot be reversed with relatively modest assistance. They may be wrong in one or another direction on this point: The "deterioration," such as it may be, may not really have any significance for the quality of American science; or, if it does, maybe it's gone too far to do anything about it. No matter.

The scientific establishment, for all the nonsense that it produces about its value to society, is a valuable and vulnerable national resource. Its care and feeding is a proper federal responsibility, and, if only in accord with the principle that the best medicine is preventive medicine — it's also the least expensive — the Smith-Karlesky diagnosis and prescription merits serious attention.—DSG

Congressional Action Threatens Two Big NASA Projects

After several lean years during which the rapidly escalating cost of the space shuttle squeezed many important science projects out of NASA's budget, space scientists were looking forward to the initiation of two long-awaited major projects. Instead, both projects are facing a tough challenge on Capitol Hill, and NASA's Jet Propulsion Laboratory (JPL) is facing an uncertain future.

Last month, a House Appropriations subcommittee, headed by Rep. Edward Boland (D-Mass.), unexpectedly stripped funds for the planned Jupiter Orbiter Probe from NASA's budget request. The project, which would involve launching twin spacecraft in 1982 to orbit Jupiter and send scientific probes into the planet's atmosphere, had already been delayed and its potential loss, according to NASA officials, would be a major setback to planetary exploration in general and to JPL in particular.

The other project facing a stiff challenge is the Large Space Telescope, an orbiting optical telescope which has won repeated endorsements from the Space Science Board of the National Academy of Sciences, but which has encountered formidable opposition from Senator William Proxmire (D-Wisc.). Proxmire, who occupies a key position as chairman of the Senate appropriations subcommittee which handles NASA's budget, has recently acquired a powerful weapon with which he hopes to shoot the telescope down: a report by the General Accounting Office (GAO), which claims that the total cost of building and operating the telescope could run as high as $1.4 billion, far above earlier estimates.

As for the Jupiter Orbiter Probe, the House appropriations subcommittee is said to have been unwilling to approve two major NASA projects in one year, and since there had been heavy lobbying for the space telescope, it cut the Jupiter project from the budget. The full committee, which met last week after SGR had gone to press, was expected to follow suit, and it is unlikely that the House itself will restore the funds.

The fate of the project thus depends on what happens in the Senate, and NASA officials are hoping that if the Senate approves the funds, House members can be persuaded to change their minds when the bill goes to a conference committee. The crucial vote will come in mid-June, when Proxmire's subcommittee meets to mark up NASA's budget. Committee sources say that Proxmire will probably back the project, though he may change his mind if his committee approves funds for the space telescope.

If the Jupiter project is killed off, NASA officials argue, its loss would have serious consequences for planetary research. At present, the only planetary mission under development is the Voyager project, which is scheduled for launch in August this year. (It involves sending spacecraft to fly past Jupiter and then travel on to Saturn.) Thus, if the Jupiter orbiter isn't approved, no new planetary missions will be in progress, and as many as 300 people would have to be laid off at JPL. The result, NASA officials argue, would be that engineering teams would be broken up and a good deal of momentum would be lost. NASA is therefore lobbying hard to wring at least enough funds from Congress to get the project started in fiscal 1978.

The Large Space Telescope is thought to be in less trouble than the Jupiter mission, largely because space scientists have been lobbying heavily for it during the past couple of years. NASA officials are nevertheless taking Proxmire's challenge seriously.

Proxmire has long been a foe of the telescope, but this is the first year he has had a real target to shoot at. In the past two years, the Office of Management and Budget cut funds for the project from NASA's budget before the Administration's request went to Congress; thus, this is the first year that NASA is formally requesting money to start building the instrument.

Proxmire's main line of attack is that the project is too costly, and that NASA should turn its attention toward projects likely to have practical benefits. He therefore asked the GAO to calculate the cost not only of building the instrument, but of launching it, maintaining it for its projected 15-year lifetime, and collecting and analyzing the data it sends back.

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Earthquake Bill Moving Ahead

Congress is moving smoothly and speedily toward passage of a bill which would provide a major increase in funds for earthquake prediction and for ways to reduce earthquake damage. The bill, which has been waiting in the Congressional wings for the past five years, was approved unanimously by the Senate last month and it has also cleared the House Committee on Science and Technology.

The legislation would authorize expenditure of more than $200 million over the next three years, substantially more than the Ford Administration had proposed in its valedictory budget (SGR Vol. VII, No. 2). It would require the President to prepare a plan for research and development on earthquake prediction, coupled with efforts to help communities respond to earthquake warnings. Funds would also be channeled into the design of earthquake-resistant buildings, dams, and other structures.

Suit Filed to Block Recombinant Guidelines

In an attempt to block federal support for recombinant DNA experiments, Friends of the Earth, an environmentalist organization, last month filed suit in federal court in New York. The suit charges that the National Institutes of Health (NIH) violated the National Environmental Policy Act by failing to publish an environmental impact statement before issuing recombinant DNA guidelines and funding experiments. It contends that the guidelines are therefore illegal and that they should be withdrawn and federal funding halted pending the resolution of safety issues.

The suit, which has so far attracted little attention, is being taken seriously in NIH because, under a strict interpretation of the law, Friends of the Earth may have a case.

NIH issued its guidelines last July, but it didn't publish draft environmental impact statement until September. A final statement has now been written, and it is under review in the Department of Health, Education, and Welfare before being released.

The National Environmental Policy Act (NEPA) requires that government actions likely to affect the environment must be preceded by publication of an analysis setting out the potential environmental implications and discussing alternative courses of action. Clearly, NIH didn't follow that procedure in releasing its guidelines, and it therefore seems to have violated the letter of the law.

NIH Director Donald Fredrickson in fact admitted when he released the draft impact statement last year that the process had got a bit out of step. He argued, however, that prompt publication of the guidelines was justified because they replaced a set of voluntary controls which were in some respects too lax. "The public interest required immediate issuance of the guidelines rather than deferral for the months that would be required for completion of the NEPA process," the draft statement said. "This was because the escape of potentially hazardous organisms was more likely in the absence of NIH action. Further, prompt issuance of the guidelines was believed necessary in order to promote their acceptance by scientists in the United States and abroad who do not come under the purview of NIH," the statement continued.

Though that may have been a logical approach, the Friends of the Earth suit contends that it was illegal. NIH has 60 days to respond to the charges, but Friends of the Earth may seek an immediate injunction to speed the legal process up a bit.

NASA

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GAO concluded that, in addition to NASA's projected $435 million to design and build the instrument, it could cost $65 million for tracking and data acquisition, $96 million for inflation, $470 million for operations costs (including the establishment of a new institute to analyze the data), $81 million for salaries of NASA personnel, and $211 million to launch the instrument with the shuttle and to visit it during later shuttle flights for maintenance and possible return to Earth for overhaul. The total life cycle costs could therefore be about $1.4 billion, GAO concluded.

Proxmire immediately issued a press release calling the GAO figures the telescope's "true cost to the taxpayer." NASA officials have charged that the figures present a distorted picture, however. In a letter printed in the GAO report, for example, NASA Associate Administrator for Space Science Noel Hinners argues that NASA has made no commitment for establishing a science institute, that GAO's estimate for launch and refurbishment costs are exaggerated because the telescope will share the shuttle bay with other payloads, and that adding inflation and personnel costs is not the standard way to estimate the cost of government projects. He claims that the operation costs would be about $10-15 million a year, excluding the launch and maintenance expenses.

NASA has recently secured a promise from the European Space Agency that Europe will provide about $80 million toward the cost of building and operating the telescope, and there is some concern that if Congress begins to turn sour on the project, European support could disappear.

It is noteworthy that Proxmire has failed in the past to convince other committee members to turn off funds for NASA projects, most conspicuously the space shuttle. If he is unsuccessful there, he will probably try to delete the funds when the bill goes to the Senate floor. NASA and its clients in the scientific community have been lobbying vigorously for the telescope for the past few years, however, and the expectation is that the project will just survive Proxmire's assault.—CN

(Copies of the GAO report, *Status and Issues Pertaining to the Proposed Development of the Space Telescope Project,* are available from GAO, Distribution Section, PO Box 1020, Washington DC 20013, for $1. Ask for PSAD-77-98)

Science v. Government Report

"A child's deliberate objection to participation in research should be binding unless the research holds out a prospect of a direct benefit that is important to the health or well-being of the child, and is available only in the context of research."

Staff recommendation on research involving children, delivered May 6 to the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research.

Ebert to Head Carnegie Institution

James D. Ebert, president and director of the Marine Biological Laboratory, Woods Hole, Mass., has been appointed president of the Carnegie Institution of Washington. He will take office in July 1978, succeeding Philip Abelson, who will have reached Carnegie's mandatory retirement age of 65 by that time. Abelson is expected to continue on as editor of *Science,* weekly journal of the American Association for the Advancement of Science, a post he has held since 1962. The AAAS recently adopted a mandatory retirement age of 65, but those employed before adoption of the rule may serve until age 70.

Letter to the Editor

To the Editor:

Your article (SGR Vol. VII, No. 6) on the manner in which the National Cancer Institute has handled the breast x-ray screening program suggests that the difference between a "demonstration" project and a "clinical trial" is significant insofar as it relates to informed consent. The Department of Health, Education and Welfare guidelines on the protection of human subjects (Part 46 of Title 45 of the Code of Federal Regulations) apply to "research, development, and related activities."

The NIH office responsible for implementing the guidelines describes a "related activity" as one "labelled other than research or development as, for instance training, demonstration, improvement, or support, but which nevertheless contains r & d component." If it is correct that the screening project contained an element of research (as opposed to being exclusively for the benefit of the patients screened), then the informed consent arrangements for those screened should have been no less rigorous than if the study had been called "research" or a "clinical trial."

Sincerely,
Joseph S. Warner
Director, Grant and Contract Administration
Yale University

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Winners Say NSF Peer Review Works Well

Following a number of attacks on the peer review process, the National Science Foundation (NSF) launched a major survey a couple of years ago to find out what grant applicants and reviewers think about the process. The survey has turned up the unsurprising findings that successful applicants believe the system works well, unsuccessful applicants are less enthusiastic about it, and reviewers have mixed feelings.

The survey, the results of which were announced last month, also found that although a significant proportion of respondents expressed concern with some aspects of the system, there was little uniformity in their prescriptions for reforming it. One of the few major points of agreement, however, was that some form of appeals procedure should be established to enable unsuccessful applicants to challenge decisions against their proposals.

The survey was an elaborate affair, commissioned jointly by the National Science Board, NSF's policy-making council, and the House subcommittee on Science, Research and Technology, which held exhaustive hearings on NSF's peer review process in mid-1975. The General Accounting Office controlled receipt of the questionnaires to ensure the anonymity of respondents and it also checked the statistical tabulation of the replies. The analysis of the results was carried out by Deborah R. Hensler, a consultant to the National Science Board.

Hensler says in her report that "although the Foundation's peer review process has recently been subjected to criticism from both the scientific community and Congress, the picture of the process that emerges from these surveys is generally positive."

Hensler found that the vast majority of applicants whose most recent proposal was funded believe that the peer review procedure used was appropriate, while half of those whose proposals were turned down said they thought the procedure was inappropriate. Of the reviewers, opinion was fairly evenly divided between those who thought the system was sound and those who thought that it could be improved by some minor reforms. Very few reviewers (about 4 per cent) thought that it suffered from major weaknesses.

As for establishing an appeals procedure, 73 per cent of all applicants said they would favor such a move, and 84 per cent of those whose proposals were turned down said they would have appealed the decision if a formal appeals process had existed.

NSF has recently made a move to open up the review process by making verbatim, unsigned copies of reviewers' reports available to applicants on request. That policy was approved by a substantial majority of the respondents. There was, however, little enthusiasm for opening up the process even further. For example, only 19 per cent of the reviewers and 30 per cent of the applicants said they would favor revealing the names of reveiwers to applicants, and 35 per cent of the reviewers said they would refuse to review proposals if such a policy were adopted.

Similarly, substantial majorities of both reviewers and applicants are opposed to treating reviews as public information.

The survey results are available free of charge from NSF, Mail, Security and Records Section, 1800 G St. NW, Washington, DC 20550. Ask for report Number NSF 77-33.

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